

MUCOSAL DTPa VACCINES

ABSTRACT OF THE DISCLOSURE

5 Mucosal DTPa vaccines, especially intranasal vaccines, comprising (a) a diphtheria antigen, a tetanus antigen and an acellular pertussis antigen, and (b) a detoxified mutant of cholera toxin (CT) or *E. coli* heat labile toxin (LT). Component (b) acts as a mucosal adjuvant. The acellular pertussis antigen preferably comprises pertussis holotoxin (PT) and filamentous haemagglutinin (FHA) and, optionally, pertactin. The mucosally-delivered combined DTPa
10 formulation is capable of generating a level of protection against *B. pertussis* infection equivalent to that observed by alum-adjuvanted parenteral administration.